Listing of Claims

1   Claim 1 (Currently Amended): A method of processing a plurality of layer-3

2   datagrams in a first edge router, said first edge router being connected to a second edge router

3   by a layer-2 network, said method comprising:

4   provisioning in said first edge router a plurality of virtual circuits to said second edge

5   router on said layer-2 network, said plurality of virtual circuits being associated with a layer-

6   3 route;

7   receiving in said first edge router said plurality of layer-3 datagrams;

8   determining in said first edge router a subset of layer-3 datagrams, with each datagram

9   in said subset of layer-3 datagrams having a corresponding layer-3 route equal to said layer-3

10   route, wherein said subset of layer-3 datagrams are comprised in said plurality of layer-3

11   datagrams;

12   encapsulating each of said subset of layer-3 datagrams in a corresponding plurality

13   of layer-2 packets, all of the plurality of layer-2 packets corresponding to some of said subset

14   of layer-3 datagrams being encapsulated for sending on a first one of said plurality of virtual

15   circuits and all of the plurality of layer-2 packets corresponding to some other of said subset

16   of layer-3 datagrams being encapsulated for transmission on another one of said plurality of

17   virtual circuits; and

18   sending said plurality of layer-2 packets related to said subset of layer-3 datagrams

19   on said layer-2 network according to said encapsulating,

20   wherein said determining comprises using a destination address comprised in each of

21   said layer-3 datagrams to determine said corresponding layer-3 route,

22   wherein said determining further determines whether to transmit each of said subset

23   of layer-3 datagrams in either said first one of said plurality of virtual circuits or said another

24   one of said plurality of virtual circuits, and

25   wherein said encapsulating comprises using a header which identifies the determined

26   virtual circuit for each layer-2 packet of the corresponding layer-3 datagram.

27   Claim 2 (canceled)

1   Claim 3 (Currently Amended): The method of claim 1 2, wherein said layer-2 network

2   comprises a plurality of switches providing a plurality of physical paths between said first

3   edge router and said second edge router, said first one of said plurality of virtual circuits

4   being provided on a first one of said plurality of physical paths and said second one of said

5   plurality of virtual circuits being provided on a second one of said plurality of physical paths.

1   Claim 4 (Currently Amended): The method of claim 1 2, further comprising selecting

2   one of said plurality of virtual circuits for transmitting each of said subset of layer-3

3   datagrams, wherein said encapsulating is performed after said selecting.

1   Claim 5 (Original): The method of claim 4, wherein said determining comprises

2   retrieving a route entry from a forwarding table using said destination address of a first IP

3   datagram, wherein said route entry indicates whether said IP route is to be used to transport

4   said first IP datagram, and wherein said selecting is performed based on said route entry.

1   Claim 6 (Original): The method of claim 5, wherein said determining is implemented

2   in the form of a process under the control of a scheduler, wherein said process and said

3   scheduler are implemented substantially in the form of software in said first edge router.

1   Claim 7 (Original): The method of claim 4, wherein said determining and selecting

2   are implemented using a data structure, which when traversed using said destination address

3   returns a layer-2 header corresponding to a virtual circuit on which a corresponding IP

4   datagram is to be sent.

1   Claim 8 (Previously Amended): The method of claim 7, wherein said determining and

2   said selecting are implemented in an interrupt handler and wherein said data structure

3   comprises a tree.

1   Claim 9 (Currently Amended): The method of claim 1 2, wherein layer-3 comprises

2   Internet Protocol (IP) such that layer-3 datagrams, layer-3 protocol, and layer-3 route

3   respectively comprise IP datagrams, IP protocol, and IP route, and wherein said layer-2

4   comprisesasynchronous transfer mode (ATM) such that said layer-2 packets comprise ATM

5   cells.

1   Claim 10 (Currently Amended): A computer readable medium carrying one or more

2   sequences of instructions for causing a first edge router to process a plurality of layer-3

3   datagrams in a first edge router, said first edge router being connected to a second edge router

4   by a layer-2 network, wherein execution of said one or more sequences of instructions by one

5   or more processors contained in said first edge router causes said one or more processors to

6   perform the action of:

7   provisioning in said first edge router a plurality of virtual circuits to said second edge

8   router on said layer-2 network, said plurality of virtual circuits being associated with a layer-

9   3 route;

10   receiving in said first edge router said plurality of layer-3 datagrams;

11   determining in said first edge router a subset of layer-3 datagrams, with each datagram

12   in said subset of layer-3 datagrams having a corresponding layer-3 route equal to said layer-3

13   route, wherein said subset of layer-3 datagrams are comprised in said plurality of layer-3

14   datagrams;

15   encapsulating each of said subset of layer-3 datagrams in a corresponding plurality

16   of layer-2 packets, all of the plurality of layer-2 packets corresponding to some of said subset

17   of layer-3 datagrams being encapsulated for sending on a first one of said plurality of virtual

18   circuits and all of the plurality of layer-2 packets corresponding to some other of said subset

19   of layer-3 datagrams being encapsulated for transmission on another one of said plurality of

20   virtual circuits; and

21   sending said plurality of layer-2 packets related to said subset of layer-3 datagrams

22   on said layer-2 network according to said encapsulating,

23   wherein said determining comprises using a destination address comprised in each of

24   said layer-3 datagrams to determine said corresponding layer-3 route,

25   wherein said determining further determines whether to transmit each of said subset

26   of layer-3 datagrams in either said first one of said plurality of virtual circuits or said another

27   one of said plurality of virtual circuits, and

28   wherein said encapsulating comprises using a header which identifies the determined

29   virtual circuit for each layer-2 packet of the corresponding layer-3 datagram.

1   Claim 11(Canceled)

2   Claim 12 (Currently Amended): The computer readable medium of claim 10 11,

3   wherein said layer-2 network comprises a plurality of switches providing a plurality of

4   physical paths between said first edge router and said second edge router, said first one of

5   said plurality of virtual circuits being provided on a first one of said plurality of physical

6   paths and said second one of said plurality of virtual circuits being provided on a second one

7   of said plurality of physical paths.

1   Claim 13 (Currently Amended): The computer readable medium of claim 10 11,

2   further comprising selecting one of said plurality of virtual circuits for transmitting each of

3   said subset of layer-3 datagrams, wherein said encapsulating is performed after said selecting.

1   Claim 14 (Original): The computer readable medium of claim 13, wherein said

2   determining comprises retrieving a route entry from a forwarding table using said destination

3   address of a first IP datagram, wherein said route entry indicates whether said IP route is to

4   be used to transport said first IP datagram, and wherein said selecting is performed based on

5   said route entry.

1   Claim 15 (Original): The computer readable medium of claim 14, wherein said

2   determining is implemented in the form of a process under the control of a scheduler, wherein

3   said process and said scheduler are implemented substantially in the form of software in said

4   first edge router.

1   Claim 16 (Original): The computer readable medium of claim 13, wherein said

2   determining and selecting are implemented using a data structure, which when traversed

3   using said destination address returns a layer-2 header corresponding to a virtual circuit on

4   which a corresponding IP datagram is to be sent.

1   Claim 17 (Original): The computer readable medium of claim 16, wherein said

2   determining and said selecting are implemented in an interrupt handler and wherein said data

3   structure comprises a tree.

1   Claim 18 (Currently Amended): A first edge router for processing a plurality of layer-

2   3 datagrams, said first edge router being connected to a second edge router by a layer-2

3   network, said first edge router comprising:

4   means for provisioning a plurality of virtual circuits to said second edge router on said

5   layer-2 network, said plurality of virtual circuits being associated with a layer-3 route;

6   means for receiving in said first edge router said plurality of layer-3 datagrams;

7   means for determining in said first edge router a subset of layer-3 datagrams, with

8   each datagram in said subset of layer-3 datagrams having a corresponding layer-3 route equal

9   to said layer-3 route, wherein said subset of layer-3 datagrams are comprised in said plurality

10   of layer-3 datagrams;

11   means for encapsulating each of said subset of layer-3 datagrams in a corresponding

12   plurality of layer-2 packets, all of the plurality of layer-2 packets corresponding to some of

13   said subset of layer-3 datagrams being encapsulated for sending on a first one of said plurality

14   of virtual circuits and all of the plurality of layer-2 packets corresponding to some other of

15   said subset of layer-3 datagrams being encapsulated for transmission on another one of said

16   plurality of virtual circuits; and

17   means for sending said plurality of layer-2 packets related to said subset of layer-3

18   datagrams on said layer-2 network according to said encapsulating,

19   wherein said means for determining uses a destination address comprised in each of

20   said layer-3 datagrams to determine said corresponding layer-3 route,

21   wherein said means for determining further determines whether to transmit each of

22   said subset of layer-3 datagrams in either said first one of said plurality of virtual circuits or

23   said another one of said plurality of virtual circuits, and

24   wherein said means for encapsulating uses a header which identifies the determined

25   virtual circuit for each layer-2 packet of the corresponding layer-3 datagram.

1   Claim 19 (Canceled)

1   Claim 20 (Currently Amended): The first edge router of claim 18 ~~19~~, further
2   comprising means for selecting one of said plurality of virtual circuits for transmitting each
3   of said subset of layer-3 datagrams.

1   Claim 21 (Original): The first edge router of claim 20, wherein said means for
2   determining retrieves a route entry from a forwarding table using said destination address of
3   a first IP datagram, wherein said route entry indicates whether said IP route is to be used to
4   transport said first IP datagram, and wherein said selecting is performed based on said route
5   entry.

1   Claim 22 (Original): The first edge router of claim 20, wherein said means for
2   determining and said means for selecting are implemented using a data structure, which when
3   traversed using said destination address returns a layer-2 header corresponding to a virtual
4   circuit on which a corresponding IP datagram is to be sent.

1   Claim 23 (Currently Amended): A first edge router for processing a plurality of layer-
2   3 datagrams, said first edge router being connected to a second edge router by a layer-2
3   network, said first edge router comprising:
4   a memory storing data indicating that a plurality of virtual circuits are provisioned to
5   said second edge router on said layer-2 network, said data further indicating that said
6   plurality of virtual circuits are associated with a layer-3 route;
7   an inbound interface receiving said plurality of layer-3 datagrams, wherein a subset
8   of layer-3 datagrams comprised in said plurality of layer-3 datagrams are to be transmitted
9   on said layer-3 route;
10   a virtual circuit (VC) determination block determining to send some of said subset of
11   layer-3 datagrams on a first one of said plurality of virtual circuits and some other of said
12   subset of layer-3 datagrams on another one of said plurality of virtual circuits; ~~and~~
13   an outbound interface sending each of said subset of layer-3 datagrams on a
14   determined one of said plurality of virtual circuits in the form of a plurality of layer-2 packets

15   on said layer-2 network; and

16   a forwarding block determining that said subset of layer-3 datagrams are to be

17   transmitted on said layer-3 route based on a destination address contained in each of said

18   plurality of layer-3 datagrams,

19   wherein said VC determination block determines the specific virtual circuit on which

20   to forward each of said subset of layer-3 datagrams after said forwarding block determines

21   that said subset of layer-3 datagrams are to be transmitted on said layer-3 router.

1   Claim 24 (Currently Amended): The first edge router of claim 23, further comprising:

2   ~~a forwarding block determining that said subset of layer-3 datagrams are to be~~

3   ~~transmitted on said layer-3 route based on a destination address contained in each of said~~

4   ~~plurality of layer-3 datagrams, wherein said VC determination block determines the specific~~

5   ~~virtual circuit on which to forward each of said subset of layer-3 datagrams after said~~

6   ~~forwarding block determines that said subset of layer-3 datagrams are to be transmitted on~~

7   ~~said layer-3 router,~~

8   a segmentation block segmenting each of said subset of layer-3 datagrams into a

9   plurality of payloads; and

10   an encapsulator encapsulating said plurality of payloads in a corresponding plurality

11   of layer-2 packets, wherein said plurality of layer-2 packets corresponding to each layer-3

12   datagram are encapsulated according to the determination of said VC determination block.

1   Claim 25 (Original): The first edge router of claim 24, wherein said layer-2 network

2   comprises a plurality of switches providing a plurality of physical paths between said first

3   edge router and said second edge router, said first one of said plurality of virtual circuits

4   being provided on a first one of said plurality of physical paths and said second one of said

5   plurality of virtual circuits being provided on a second one of said plurality of physical paths.

1   Claim 26 (Previously Presented): The first edge router of claim 24, further

2   comprising:

3   a forwarding table containing a plurality of route entries, wherein said forwarding

4   block retrieving a route entry from said forwarding table using said destination address of a

5   first IP datagram, wherein said route entry indicates whether said IP route is to be used to

6   transport said first IP datagram, and wherein said VC determination block selects either said

7   first one of said plurality of virtual circuits or said another one of said plurality of virtual

8   circuits based on said route entry.

1   Claim 27 (Original): The first edge router of claim 24, further comprising a data

2   structure, which when traversed using said destination address returns a layer-2 header

3   corresponding to a virtual circuit on which a corresponding IP datagram is to be sent.

1   Claim 28 (Currently Amended): The first edge router of claim 1 2, wherein layer-3

2   comprises Internet Protocol (IP) such that layer-3 datagrams, layer-3 protocol, and layer-3

3   route respectively comprise IP datagrams, IP protocol, and IP route.

1   Claim 29 (Previously Presented): The first edge router of claim 28, wherein each of

2   said plurality of virtual circuits comprises a permanent virtual circuit (PVC).

1   Claim 30 (Previously Presented): The first edge router of claim 29, wherein datagrams

2   related to the same flow are transmitted on the same virtual circuit such that an end system

3   need not re-sequence the data in the received datagrams.